

### INTRODUCTION

Sear Brown performed a site review and survey of the Capitol grounds to determine the condition of site features such as sidewalks, stairways, curb and gutters, handicap ramps, parking lots, and utilities. These items were photographed and logged and are included in the Exterior Site Survey found in the Appendices. Sear Brown then analyzed the capacities and conditions of the existing utilities to determine whether or not they complied with current standards and met the operational needs of the facilities they serviced. Recommendations were made for improvements to the site features and utility systems for the Capitol site.

### STANDARDS

The following list contains the sources of design standards used to evaluate the existing utilities at the Capitol. These standards address the three main goals of this project: life safety, function, and historic preservation. The list also includes items used for conceptual design of proposed facilities or improvements. It should be noted that although the Capitol site is not technically subject to City regulations because it is a State-owned facility, all utility services (water, sewer, storm drain) are within Salt Lake City (SLC) service areas and utilize SLC facilities. Therefore, it has been assumed that site/utility upgrades should comply with SLC standards and regulations.

#### 1. Life Safety

- a. STANDARD: Provide adequate water supply for fire protection of the Capitol site.
  - 1) Objective: Comply with SLC Corp. Water Design Requirements for Developments (6-7-99)
    - a) Min. 20 psi residual pressure during fire scenario
    - b) Separate fire flow line from culinary water supply
  - 2) Objective: Comply with SLC Fire Marshall requirements.
    - a) Flow requirements for public buildings
  - 3) Objective: Repair/replace water lines in poor condition or of inadequate in size.
- b. STANDARD: Reduce threat of contamination to groundwater from sewer system leakage.
  - 1) Objective: Comply with SLC Corp. Sanitary Sewer Requirements for Developments (6-7-99).
  - 2) Objective: Repair/Replace sewer lines in poor condition.

- c. STANDARD: Reduce risk of injury to Capitol patrons from ice buildup in parking areas, pedestrian walkways and streets.
  - 1) Objective: Comply with SLC Corp. Storm Drainage Requirements for Developments (6-7-99).
  - 2) Objective: Repair/replace storm drains, curbs and gutters in poor condition.
- d. STANDARD: Reduce risk of injury from site elements (stairs, stair features, sidewalks) in poor condition.
  - 1) Objective: Repair/replace site elements in poor condition.
- e. STANDARD: Provide for ADA accessibility on site elements (stairs, stair features, sidewalks).
  - 1) Objective: Repair/replace site elements as needed to accommodate ADA accessibility.

## 2. Function

- a. STANDARD: Comply with SLC Standards to bring utility systems up to current codes.
  - 1) Objective: Use SLC Corp. Water Design Requirements for Developments (6-7-99).
    - a) Use new Class 52 DIP lines east of Main Street.
  - 2) Objective: Use SLC Corp. Sanitary Sewer Requirements for Developments (6-7-99).
    - a) PVC pipe, 8-inch minimum diameter main lines
    - b) Peaking Factor = 4.0 (typical)
  - 3) Objective: Use SLC Corp. Storm Drainage Requirements for Developments (6-7-99).
    - a) On-Site Detention Design Program – ‘DRAIN’ software (SLC Public Utilities)
    - b) Rainfall Intensity Duration Analysis, Sept. 1999 (Precipitation Curves)
    - c) Design storm drain facilities with maximum discharge of 0.2 cfs/acre.
    - d) Design detention pond facilities for 100-year, 24-hour storm event.
    - e) Design storm drain pipes for 10-year, 24-hour storm event.
    - f) No direct discharge of storm water allowed into City Creek.
    - g) Storm water discharge from Capitol site cannot increase above existing discharge rates at outfall points.

## 3. Historical Preservation

- a. STANDARD: Improve accessibility to Capitol building and historical site features.
  - 1) Objective: Repair/replace site elements (stairs, stair features, sidewalks) to improve accessibility to Capitol building and other historical features on site.

## 1. Water Distribution System

Culinary water supply for the State Capitol originates at Morris Reservoir, a 5.0-million gallon (MG) capacity reservoir located near 18<sup>th</sup> Avenue and E Street. City Creek Water Treatment Plant supplies the reservoir, as shown in Exhibit V-1. Flow from the reservoir passes through two pressure regulating stations and is distributed to a northern pressure zone as well as the State Capitol pressure zone. The 2.0 MG Capitol Hills tanks located to the east are able to provide backup supply to the Capitol zone from the adjacent pressure zone if necessary.

The existing water distribution system consists of 80 to 90 year-old 6-inch cast iron pipes with lead joints. Based on the available data, a majority of the pipes were constructed around 1913. These pipes are still in service after over 85 years, well beyond the intended design life of such pipes. Flow from the reservoir reaches the Capitol pressure zone through a 12-inch pipe built in 1962. A 6-inch cast iron pipe tees from the 12-inch to form the northern distribution line along 500 North. A 6-inch cast iron loop connects to the line on 500 North and traverses around the main Capitol buildings, providing both culinary supply and fire flow protection.

Other lines near the Capitol include a 12-inch cast iron line along East Capitol constructed in 1928 and 1929, and an additional steel pipe segment connecting to the Capitol Hills tanks area added in 1954. A newer 12-inch mechanical joint pipe (MJP) was constructed in 1958 along the southern boundary along 300 North Street. This newer line parallels several additional 6-inch lines built between 1910 and 1915.

Three smaller diameter lines currently exist on the eastern property of the Capitol. These 3- and 4-inch lines are believed to be abandoned, originally part of the previous irrigation system.

Based on conversations with the Facilities Management Department at the Capitol, the current water configuration meets the culinary and irrigation demands of the site. However, the amount of fire flow supply available to the Capitol is limited due to the diameter and hydraulics of the existing pipes. In addition, ruptured lines are a frequent problem due to heavy construction vehicles traveling on the roadways above the water lines. The older pipes cannot support the additional load, which causes them to shift and break.

Data from Salt Lake City Public Utilities Department provided 6 years of water usage records based on readings from two meters located along 500 North. The water billing account records were used to calculate an average water use of approximately 15 gallons per minute (gpm) during the winter months. By using data from the winter months, the average values were strictly culinary water without irrigation use for the Capitol. Culinary water use is assumed similar throughout the year.

Using the Uniform Building Code, the Salt Lake City Fire Department calculated a rough estimate of fire flow required for the Capitol. Based on an assumed Type II One-Hour construction classification for the Capitol building, an estimated fire flow rate of 6,000 gpm is required. This value could be reduced by as much as one-half should the facility install fire sprinklers. The Capitol is also allowed up to a 75% reduction to the base fire flow rate number by applying the State building classification exception. Applying this factor, the required 6,000 gpm fire flow rate may be reduced to a minimum of 1,500 gpm. This reduction factor is an exception for State buildings, and it should be noted that the maximum reduction factor for buildings under the City's jurisdiction is a more conservative 50%. Actual fire flow requirements would involve more research by the SLC Fire

Department during the design phase of the renovation project.

Fire flow tests were performed in April 2000 along 500 North Street. While the resulting static and residual pressures on the 6-inch line were noted at 95 psi and 55 psi, respectively, the measured flow equated to only 627 gpm. This is not a sufficient flow rate for a fire scenario at the Capitol site. It should be noted that tests were not performed on the 6-inch loop around the Capitol due to liability issues since the Capitol is a “private” water system. However, the results of the test along 500 North should be representative of the water system at the Capitol.

During a site visit, the fire hydrant closest to the Archives building was photographed. Access to the hydrant is limited by the narrow driveway between the Archives building and the Greenhouse facilities. See the photos below.



*LOCATION OF HYDRANT NEAR ARCHIVES*



*ACCESS TO HYDRANT NEAR ARCHIVES*

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## 2. Sanitary Sewer System

The existing sanitary sewer system for the State Capitol is characterized by 8-inch vitrified clay pipes (VCP) built approximately 80 to 90 years ago. Due to limited historical data on the sewer system, the sewer system is assumed to have been constructed in a time frame similar to the water system, estimated between 1910 and 1920. Exhibit V-2 shows the existing sewer system and service areas.

The State Capitol grounds are divided into three sanitary sewer service areas. One area collects flow from the Daughters of Utah Pioneers (DUP) and Historical Museums located southwest of the Capitol near 300 North and Columbus Street. This section contains an abandoned sewer line beneath the parking lot southwest of the Vietnam Memorial that originally served houses along a former stretch of Wall Avenue that has since been removed. The second service area collects flow from the Capitol, Cafeteria, Plaza and State Office Building, discharging west down 400 North Street. The third area collects flow from the Archives Building, Greenhouse and Data Processing Center discharging west along 500 North Street.

Based on the estimated culinary water use of 15 gpm for an average day, and assuming that demand occurs within an 8-hour period daily (one-third of a day), an estimated daily average sanitary sewer flow rate of 45 gpm is calculated. Applying a peaking factor of 4, the rate equals an estimated 180 gpm. Based on the data available, there are no notable problems with the existing sewer system. However, it should be noted that no flow monitoring or video taping of the lines is known to have taken place to check for infiltration or exfiltration problems common in these types of older systems.

## 3. Storm Drain System

The existing storm drain system for the State Capitol consists of a combination of vitrified clay pipe (VCP) and reinforced concrete pipe (RCP). Due to limited data on the historical aspects of the system, the exact age is unknown. The VCP sections are assumed to be over 50 years old, and the RCP segments are assumed to be more recent additions to the system. Exhibit V-3 shows the existing storm drain system and drainage area map.

The Capitol site divides into four drainage areas. Table V-1 shows percentages of landscaped, paved, or roof land cover for each area. Peak flows for the 10-year, 24-hour storm event are also listed. These flows were calculated for each drainage area using the rational formula (SLC standard method) and the estimated percentages of type of land cover. Currently, the Capitol site does not contain any detention facilities. SLC regulations require controlled discharge and necessary detention facilities for new construction, including bringing entire sites into compliance if any new construction or remodeling activity is permitted.

TABLE V-1: EXISTING CONDITIONS – UTAH STATE CAPITOL SITE					
		TYPE OF GROUND COVER %			10-YR RUN
DRAINAGE AREA	SIZE (acres)	LANDSCAPED	PAVED	ROOF	(c
'A'	22 acres	52%	35%	13%	13
'B'	4 acres	32%	49%	19%	5
'C'	5 acres	28%	54%	18%	5
'D'	7 acres	31%	69%	0%	9
Total	38 acres	45%	43%	12%	

Drainage Area 'A' contains approximately 22 acres and is the largest drainage area on site. An estimated one half of the area is landscaped and one third of it is covered in pavement, either concrete or asphalt. Drainage Area 'A' contains the Capitol, Plaza and Cafeteria as well as the front lawns. Flow from the Cafeteria and Plaza area is piped beneath the plaza area and discharged through a bubble-up box on the west lawn. The flow travels across the lawn or down the curb to the outfall point at Columbus Street and 300 North Street. At this point, the runoff enters a public storm drain system.

Drainage Area 'B' contains the State Office Building and part of the adjacent NW parking lot and lawn. The outfall point is located at the intersection of Columbus Street and 400 North Street. Runoff from the office is piped around the parking lot and discharged prior to the outfall point through the edge of the curb of the west entrance roadway (see photo). The flow then travels down the curb to the outfall point.



OUTFALL POINT AT ENTRANCE TO  
PARKING AREA FROM COLUMBUS ST.

Drainage Area 'C' collects drainage from the Data Processing Center, Archives Building, Greenhouse and surrounding parking lot and lawn on the northern edge of the site. A high percentage of the drainage area is paved with asphalt or concrete. Two catch basins collect and convey the runoff to the adjacent outfall point on 500 North Street. Exhibit V-3 shows the location of the outfall point.

As shown on Table V-1, approximately 70% of Drainage Area 'D' is covered by asphalt parking lots. The drainage area runoff is directed by a combination of sheet flow and curb and gutter flow into the two catch basins at the outfall point.



CATCH BASIN ON EAST CAPITOL NEAR  
ENTRANCE NOT SAFE FOR BICYCLES

Several problems were noted with the existing storm drain system. As shown in the photo to the left, the grate on the East Capitol catch basin is not bicycle safe, which makes it a potential safety hazard. Additionally, it is the only catch basin for the large parking lots on the east side of the Capitol site. A second grate is located around the corner near the parking entrance as shown on the following page; however, it is plugged with debris. Flow from these catch basins discharges directly into City Creek without detention or water quality

treatment, according to the available plans from the City. This creates an environmental concern and violates SLC standards for allowable storm water discharges.

The high percentage of pavement and roof-covered areas within the Capitol site generates large volume, high velocity runoff. Most of this flow travels by sheet flow or curb and gutter flow capable of erosion and scour. The predictable results are visible in the photos below. Eroded asphalt and damaged curbs are common in several locations. Such areas tend to develop more problems as time progresses.



*ASPHALT DETERIORATION AND APPARENT PONDING LOCATION AT ENTRANCE TO SW PARKING AREA*



*CURB AND GUTTER DAMAGE AND ASPHALT DETERIORATION ALONG 300 NORTH ACROSS FROM COUNCIL HALL*



*ASPHALT SCOUR ALONG 300 NORTH WEST OF STATE STREET*



*CATCH BASIN ONE EAST ENTRANCE DRIVEWAY TO CAPITOL PLUGGED WITH DEBRIS*



*ASPHALT CRACKING AND DETERIORATION AT WEST PARKING ENTRANCE ON COLUMBUS STREET*

As seen in the photo at the right, storm drainage is collected into a catch basin, but then returned to curb and gutter flow. This configuration is unusual, as the flow collected by the catch basin would normally remain in a pipe and flow to the next downstream catch basin.

Another notable problem occurs at the corner of 300 North and Columbus Street. During a site visit on a rainy day, the flow bypassed the two catch basins and formed a pool on the corner. The pool increased in size and depth until it eventually flowed south across the intersection and down Columbus Street into the downstream catch basin. During the winter, this pond would freeze and create safety issues for pedestrians and drivers.

Standing water ponds in an equipment storage area between the Archives Building near the Greenhouse. The photo at the right shows a low area curbed in by the fence. There was no visible drain or catch basin for the area.



*CATCH BASIN FLOW TO CURB AND GUTTER FLOW ALONG 300 NORTH*



*LOW AREA WITHOUT DRAINAGE ADJACENT TO ARCHIVES BUILDING*



*WEST ENTRANCE SIDEWALK ALONG COLUMBUS STREET.*



*HANDICAP RAMPS SIDEWALK AT COLUMBUS STREET AND APRICOT STREET.*



*STAIRWAY FEATURE AT WEST ENTRANCE ALONG COLUMBUS STREET.*

## 4. Site

The analysis of site conditions included an assessment of the sidewalks, stairways, and stairway elements. An Exterior Survey Report has been performed on the Capitol site and is included in the report appendices [see Appendix V. Built Site: Exterior Survey Report]. The purpose of this survey report was to review and assess the condition of the site elements such as curbs, gutters, sidewalks, stairways and parking lots. The majority of these elements are in fairly good condition with the exceptions being depicted herein.

The majority of the existing pedestrian access system is in good condition. However, several areas show signs of deterioration and cracking. As shown in the photos above, the sidewalk along Columbus Street is cracked at both the west entrance and at Apricot Street.

The stairway features at the west entrance to the Capitol are in poor condition as shown in the photos below. The stairway features on the south side of the Capitol are also showing signs of deterioration. The concrete steps and surrounding ledges are spalling and deteriorating. The top of the ledge has also chipped away. The stairs to the Mormon Battalion are in poor condition and in need of repair. The stairs are covered with loose concrete chips and rocks, creating a safety hazard for visitors.



*STAIRWAY FEATURE AT WEST ENTRANCE ALONG COLUMBUS STREET.*



*STAIRS ON SOUTH SIDE NEAR FLOWER GARDENS.*



*STAIRS ON SOUTH SIDE NEAR THE MORMON BATTALION.*

The sidewalks along the northern boundary of the Capitol grounds do not have handicap ramps, interrupting the travel path around the Capitol site. The photos below demonstrate two locations without ramps.

The main entrances and stairs to the Capitol building from the west and south side are also not ADA accessible.

The complete Exterior Survey Report (refer to the Appendices) contains an inventory of additional photos of the site. It also notes the condition of each element. For the most part, the sidewalks and stairways are in relatively good condition.

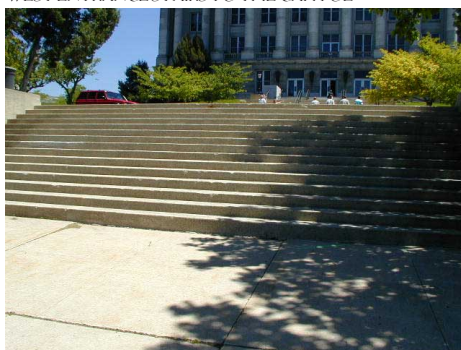


*NO HANDICAP RAMP, 500 NORTH NEAR*

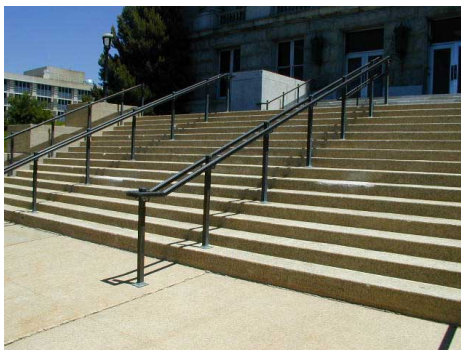


*NO HANDICAP RAMP AT 500 NORTH NEAR EAST CAPITOL*

*WEST ENTRANCE STAIRS TO THE CAPITOL*



*WEST ENTRANCE STAIRS TO THE CAPITOL*



*SOUTH ENTRANCE STAIRS TO THE CAPITOL*



### 1. Water Distribution System

The most obvious limitations on the existing water system are (1) the age and integrity of the system (a function issue) and (2) the capacity of the existing system to provide fire flow protection to the existing buildings (a life safety and historical preservation issue).

#### a. Alternative 1 – Limited Upgrade

One alternative is to simply leave the existing system as is, repairing problems as they occur. Required maintenance and repairs to broken lines are expected to become more common as the system ages and as the site demands increase. By maintaining the existing system, the Capitol will have limited fire flow capacity available in the event of a fire. These limitations may also result in damage to the water system outside of the Capitol during a high flow event such as a fire.

#### b. Alternative 2 – Full Upgrade

A second alternative is to remove and replace the existing 6-inch cast iron loop system around the Capitol in order to increase capacity and fire flow. The existing lines are old and brittle and do not meet current City standards for water distribution systems. These lines have provided service far beyond the intended design life. The existing line would be replaced with 12-inch ductile iron pipe (DIP), Class 52. This is the current pipe material specified in the City codes for this area.

A proposed 12-inch line along 500 North would connect to the newer 12-inch supply line from Morris Reservoir along Cortez Street. Construction of a new parallel line along 500 North eliminates the need to tie the larger line in to the smaller 6-inch line. Connecting to the old 6-inch line could result in construction problems and flow restrictions due to both the age and smaller size of the existing pipe. Exhibit V-4 shows the proposed improvements to the water system for this alternative.

A 12-inch loop is proposed around the Capitol complex, similar in layout to the existing loop. However, this 12-inch loop will provide fire flow only. All fire flow lines are required by City codes to be separated with valves from any culinary water supply to prevent backflow of “stale” water during periods of pressure fluctuation. To provide sufficient fire flow capacity to the Capitol, a new 12-inch DIP line is also proposed to connect to the Capitol Hills Tanks in the adjacent pressure zone. As shown in Exhibit V-4, this line connects the proposed fire flow loop and the existing 12-inch CIP along

East Capitol. This would be equipped with a check valve to supplement flow into the Capitol pressure zone if needed during a low pressure or fire flow event. Internal building fire sprinkler system connections would be tied into this new 12-inch fire main line.

The proposed 12-inch line was sized based on a conceptual model and calculations of estimated fire flow required for the State Capitol. A 12-inch diameter provides the required 20 psi minimum pressure while supplying approximately 1,800 gpm to the Capitol. The additional connection to the adjacent pressure zone is necessary to supplement the estimated 1,500 gpm fire flow demand. The available fire flow from Morris Reservoir is limited due to hydraulic constraints on the existing system (the size of the pipe and the distance between

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the supply and the Capitol), and the supply from the adjacent zone helps meet the increased demand.

Culinary water supply is proposed through an 8-inch DIP with a 6-inch master meter tied into the new 12-inch line along 500 North. The 8-inch diameter pipe size was assumed to allow flexibility to accommodate peak future demands. The 6-inch master meter was assumed based on reports that the existing 6-inch line meets current needs. Culinary water lines would connect to future buildings from the master. New hydrants would be placed at locations easily accessible by fire department personnel.

## 2. Sanitary Sewer System

The current sanitary sewer system, like the water system, has exceeded the design life and has questionable integrity (a function issue). Without any type of flow monitoring or video taped records available at the present time, it is difficult to estimate the possibility of infiltration of the wastewater into the surrounding area (a life safety/health issue). In addition, cracked pipes also allow for infiltration of ground water into the sewer system and the intrusion of roots that could clog the lines.

### a. Alternative 1 – Limited Upgrade

One alternative is to simply leave the existing system as is, repairing problems as they occur. Maintenance and repairs are expected to become more common as the system ages and site demands increase. The 8-inch line is estimated to provide sufficient capacity for future needs. However, the integrity of the pipe poses a potential threat to the environment as the pipe continues to deteriorate with age, increasing the likelihood of contamination of the surrounding subsurface areas.

### b. Alternative 2 – Full Upgrade

A second alternative is to replace and reroute the existing 8-inch VCP sewer system with 8-inch diameter polyvinyl chloride (PVC) pipe, the City's recommended pipe material. The surrounding public system consists of 8-inch lines, and the new 8-inch line is expected to provide sufficient capacity for possible future growth at the Capitol.

For conceptual design purposes, an 8-inch PVC pipe laid at a minimum slope of 0.4% can flow twice the current estimated peak flow rate of 180 gpm. The Capitol site has much higher slopes. Thus, proposing a new 8-inch sewer line will provide ample capacity for future flow rates if the pipes are laid at the minimum slope. As shown on Exhibit V-5, an 8-inch PVC trunk line is proposed to tie into the existing system at the current discharge point at Columbus and 400 North Street. This new 8-inch line will collect the sanitary sewer flow from the central service area of the Capitol. Connections to the other buildings would be designed and constructed off of the 8-inch line.

The two smaller service areas would continue to use the current systems. Should the Archives, Greenhouse or Data Processing buildings be relocated or removed, the connections would be rerouted as necessary. These existing systems adequately serve the smaller areas and are expected to accommodate the facilities in the future, pending no major changes in facility use.

### 3. Storm Drain System

#### a. Alternative 1 – Limited Upgrade

The first alternative is to maintain the existing system. By doing so the site will continue to be in violation of SLC standards for discharge into City Creek and for lack of detention and controlled discharge from the site (a function issue). Problems with ponding will pose safety threats, particularly in the winter when the water freezes (a life safety issue).

#### b. Alternative 2 – Full Upgrade

Alternative 2 allows for the addition of detention facilities shown in Exhibit V-6 to upgrade the existing storm drain system to City standards. According to SLC standards, runoff from a 100-year event must be detained and released with a maximum release rate of 0.2 cfs/acre. In order to determine the required size of the detention ponds, the City's "DRAIN" program was used. The following table summarizes the estimated

Drainage Area	Size (acres)	Detention Volume (ac-ft)	Future Release Rate with Detention (100-yr Event) (cfs)	Existing Discharge Rate without Detention (100-yr Event) (cfs)
'A'	22	1.06	4.4	21.8
'B'	4	0.25	0.75	9.3
'C'	5	0.35	0.98	8.6
'D'	7	0.25	1.4	16.7

volume of storage and release rate for each drainage area. The proposed drainage areas maintain the boundaries and land cover percentages of the existing drainage areas, with the exception that the pavement area of Drainage Area 'D' is assumed to decrease by 50%. This assumption is based on the goal of relocating a portion of the surface parking in this drainage area to an underground parking structure. Should this not be selected for implementation, the size of the detention pond will be slightly increased.

In addition, the City has requested that the direct discharge of Drainage Area 'D' into City Creek be eliminated. All runoff in Drainage Area 'D' originating on the Capitol site will be contained, detained, and rerouted to Drainage Area 'A.' Note that the addition of detention facilities results in a lower discharge in Drainage Area A even with the additional flows from Drainage Area 'D' as shown in the table above. The detention ponds will be incorporated into the overall landscape plan, as well. Note that the detention ponds shown on Exhibit V-6 are for visual purposes only. Their location, size and depth can be adjusted to facilitate any reorganization of parking or monument relocations in the area. The proposed storm drain system will consist of an increased amount of piped flow. This will reduce the amount of scour and erosion by limiting the quantities of overland flow. The new storm drain lines will be of City approved material and designed based on the final site plan.

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## 4. Site

### a. Alternative 1 – Limited Upgrade

A limited upgrade alternative assumes a site program identical to the current plan. The site upgrades would be minimal, only repairing or replacing items of necessity such as repairing sidewalks and stairways that show the worst signs of deterioration and threaten human safety (a function and life safety issue). Also, handicap ramps should be constructed at locations currently void of handicap access in order to provide complete access around the site (a function and historical preservation issue). Please refer to the Appendices for a complete site inventory and assessment.

### b. Alternative 2 – Full Upgrade

This alternative incorporates the items of Alternative 1 and adds or removes any sidewalks, stairways, or stairway elements implemented by adoption of a new master plan concept. Depending on the magnitude of the changes suggested in the master plan concept, the amount of alteration to these site elements would vary.

# RECOMMENDATIONS

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## V. BUILT SITE

The following evaluations and recommendations are summarized in the Matrix included in the Executive Summary at the beginning of this report.

### 1. Water Distribution System

The existing water system is undersized for current fire flow requirements and the age of the pipe and joint materials is creating operational difficulties. Leaks in the system due to heavy vehicles travelling over existing pipes has been experienced at the Capitol site, creating a functionality issue. The inability of the current water system to supply adequate fire flow to the Capitol site is certainly a life safety and historical preservation concern. Therefore, it is recommended that the current water system be fully upgraded by replacement with new, larger water lines which will provide the fire flow protection and service needs of the Capitol site.

### 2. Sanitary Sewer System

The existing sanitary sewer system has sufficient capacity to service the Capitol site; however, the existing pipes are also nearly ninety years old and made of a material that has also exceeded its normal life expectancy - a functionality issue. The typical problems associated with this type and age of pipe material are cracking and joint separation which allows for the following types of problems to occur: (1) groundwater may enter the pipe system impacting the sewer treatment facility by additional flow; (2) the cracking during drier periods could allow sewer flow to exit the pipe system and enter the groundwater thereby creating a potential contamination problem and life safety issue; (3) tree roots will seek this source of water and cause clogging in the pipe system. Therefore, it is recommended that the current sanitary sewer system be fully upgraded by replacement with new sewer lines which will provide for the service needs of the Capitol site and reduce the potential of the aforementioned problems.

### 3. Storm Drain System

The current storm drainage system in existence at the Capitol site is limited in its function to simply a conveyance system to move the runoff away from the existing buildings and facilities to external discharge points. Although this system may have been appropriate at the time it was constructed, it does not meet current federal, state or local standards. Life safety is a concern in locations where ponding occurs, particularly in the winter months with the freezing temperatures. Current standards for water quality and storm water detention dictate that on-site detention and water quality measures be installed prior to the release of storm water runoff from a site. Not providing detention impacts downstream residents and facilities by contributing to the potential for flooding or damage to drainage facilities during storm events. Since one of the current discharge points from the Capitol site is to City Creek in Memory Grove, oils, grease, and sediment transport from the Capitol site parking lots is certainly a concern to water quality. Therefore, it is recommended that the current storm drainage system be fully upgraded by replacement with new storm drain lines, detention ponds, and water quality facilities. These facilities should be designed and installed in compliance with current state and local standards. This will help the Capitol site meet its environmental responsibility and be a good neighbor to those living downstream from the site.

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## 4. Site

The existing system of sidewalks and stairways is in relatively good shape. However, several stairways and stairway elements are in need of repair in order to maintain a safe and functional environment. Handicap ramps should be installed to allow full access to the site, particularly on the west and south side entrances to the Capitol. The plaza and stairs on the south side that lead to the front of the Capitol are in rough condition and should be repaired/restored. The recommendation is to repair the sidewalks and stairway elements showing deterioration which impairs the safety and function of the facility. Also, handicap accesses to the Capitol building and other historical features should be provided to comply with current ADA requirements.

However, should a master plan concept be selected which alters the location of these site elements or changes their function, then a “full upgrade” would be recommended. This is depicted as a dual recommendation in the Executive Summary matrix since Alternative 1 is recommended as a minimum and also included within Alternative 2 should a full upgrade be appropriate.

